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**Bioaccessability & Bioavailability Workshop
Berkley, California**

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The Petroleum Environmental Research Forum (PERF)



*Established in 1986 to Stimulate
Cooperative Research and Development of
Technology for Environmental Pollution
Control and Waste Treatment for the
Petroleum Industry*

What is PERF?



- ◆ Formed under the auspices of the National Cooperative Research and Production Act (USA)
- ◆ Run by initiative of member companies
- ◆ Maintain liaison association with Institutes, service providers and several government and academic organizations and Laboratories
- ◆ PERF is overseen by a Board of Directors and Officers

Who is PERF?

Global Team with Common Interest



◆ 14 Major Companies are Members

- Amerada Hess
- Aramco
- BP
- ChevronTexaco
- ConocoPhillips
- EniTechnologie
- ExxonMobil

- INA-Naftaplin
- Marathon
- Petro Canada
- Shell
- Statoil
- Total
- Unocal

◆ Associate Members & Representatives

- BOC
- Champion Technologies, Inc.
- Canadian Petroleum Products Institute (CPPI)

- Petrobras
- Petrozyme Technologies, Inc.

◆ Liaison Members

- American Petroleum Institute (API)
- Argonne National Laboratory (ANL)
- US Department of Energy (DOE)
- Electric Power Research Institute (EPRI)
- Energy & Environmental Research Center (EERC)
- Gas Technology Institute (GTI)
- Lawrence Berkeley National Laboratory (LBNL)
- International Association of Oil & Gas Producers (OGP)
- Oak Ridge National Laboratory (ORNL)
- University of Manchester Institute of Science and Technology (UMIST)
- Water Environmental Research Foundation (WERF)

Who Can Participate in a PERF Project?



- ◆ PERF projects are open to anyone who can meet the requirements of the participation agreement established for that project
- ◆ Project participation is not limited to PERF members or petroleum companies
- ◆ In recent PERF Co-operative research programs, special provisions have been made to set the contribution for participation lower for government agencies and trade organizations

Projects to-date

- ✉ 75 projects with a value of >**\$60 million** were completed
- ✉ 10 projects with a value of >**\$5 million** are underway
- ✉ 18 projects are under consideration



	E & P	Refinery	Both
Air	1	24	4
Water	8	12	2
Soil and GW	5	3	18
Waste	4	6	1
NDE		9	

- ◆ Traditional PERF projects involve:
 - 📄 establishing a scope of work by project sponsor/committee
 - 📄 identifying a contractor
 - 📄 division of the cost evenly among participating companies in a contractual agreement
 - 📄 sharing results among participating companies only
 - 📄 a fixed period of time during which confidentiality must be maintained
- ◆ Total cost for such projects is typically under \$250,000
 - 📄 ranges from low of \$21k to high of \$12.8 million

Examples of Traditional Refining PERF Projects



◆ Active Proposal

- 04-06 Reducing Desalter Environmental Impacts
- 04-03 CO₂ Capture Technology Review

◆ Active Projects

- 00-01 Mercury Cooperative
- 01-08 Downstream Waste Management
- 95-07 Mechanical Properties of Aging Refining Hydro-processing Reactors - Phase I

◆ Completed

- 00-03 Next Generation Lo-NO_x Burner Performance Testing
- 99-06 Upset Early Warning Devices for Wastewater Treatment Plants
- 98-09 Accidental Release Mitigation Project
- 97-04 FCC Regenerator SO_x / NO_x Emissions Database and Correlations

Examples of Traditional E&P PERF Projects



◆ Active Proposal

- 02-04 Life Cycle Analysis for Environmental Decision Making
- 03-02 Flaring Cooperative Project

◆ Active Projects

- 03-03 Managing Waste in Counties with Little Infrastructure
- 02-02 Bioremediation Sharing Project

◆ Completed

- 97-08 Scientifically-Sound Risk-Based Decision Tools for E&P Sites
- 95-12 Monitoring, Composting, and Soil Bioremediation
- 93-23 Soluble Oil Removal from Produced Water - Technology Evaluation

Research Sharing (Cooperative) Programs



- ◆ Ultimate goal is to plan research need(s) in advance, and divide research amongst participating companies
- ◆ Companies are able to leverage into large programs
 - ▢ for no increment cost
 - ▢ using in-house facilities/staff
- ◆ Concept of Research Sharing involves:
 - ▢ determining areas of mutual interest with internally funded research ongoing or planned
 - ▢ agreeing to exchange results with other participants
 - ▢ agreeing to hold information confidential for a specified period of time
 - ▢ minimum in-kind financial contributions established on a project by project basis (typically \geq \$200k)

- ◆ Targeted, efficient projects
- ◆ Flexible, responsive organization evolving over time:
 - 📄 Discussion Groups
 - 📄 Traditional → Sharing Projects
 - 📄 Liaisons with Government Agencies/Labs and Other Trade Organizations
 - 📄 Associate Membership
 - 📄 Strictly Business/Project Development → Thematic Meetings (The “Forum”)

Themes of Recent PERF Meetings

Date	Host	Location	Theme
Oct. 2002	Exxonmobil and API	Washington DC,	API and PERF
March 2003	PERF Board of Directors	San Antonio, TX,	Mercury
June 2003	Total	Paris, France	Air Quality
Nov. 2003	ConocoPhillips	Houston, TX	Deepwater & Impact of Treating Chemicals
April 2004	PetroCanada	Calgary, Canada,	Heavy Oil
July 2004	Energy & Environmental Research Center (EERC)	Grand Forks, North Dakota	Green House Gases